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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/497,051	02/02/2000	Sywe N. Lee	6762-103XX	7019

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EXAMINER	
HENN, TIMOTHY J	

ART UNIT	PAPER NUMBER
2612	

DATE MAILED: 07/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/497,051	Applicant(s) LEE ET AL.	
	Examiner Timothy J Henn	Art Unit 2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 April 2004.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-7 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,2 and 4-7 is/are rejected.

7)☒ Claim(s) 3 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 26 April 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings were received on April 30, 2004. These drawings are accepted, accordingly the drawing objections in the previous office action are withdrawn.

Specification

2. The amendment filed on April 26, 2004 overcomes the objections to the specification, these objections are therefore withdrawn.

Claim Objections

3. The amendment filed on April 26, 2004 overcomes the objections to claims 2, 5 and 6, these objections are therefore withdrawn.

Response to Arguments

4. Applicant's arguments filed April 26, 2004 in paper number 5 have been fully considered but they are not persuasive.

In the amendment the applicant argues that Mimura teaches an effective readout of a "zig-zag" pattern for both the even and odd fields as shown in figure 2(a). While this is undoubtedly the case, it is noted that claim 1, as is currently written, does not require a zig-zag readout pattern for only one field. Claim 1 recites "characterized in that said first and second light detecting elements in each row are alternately disposed

and activated by first read lines to generate odd field signals, and in that said first and second light detecting elements in two adjacent rows disposed in a serrated manner are activated by second read lines to generate even field signals". In the interpretation used in the rejection of claim 1, the first elements correspond to the elements of the first row of Mimura and the second elements correspond to the elements in the second row of Mimura. As can be seen from figure 2(a), the first elements (i.e. first row; R-B-G pixels) and the second elements (i.e. second row; G-R pixels) are alternately disposed (i.e. row 1 - row 2 - row 1 - row 2) and are activated by first read lines (i.e. the first zig-zag readout pattern) to generate odd field signals and that first and second light detecting elements in two adjacent rows (i.e. row 2 and row 3) are disposed in a serrated manner (see figure 2(a)) and are activated by second read lines to generate even field signals (i.e. the second zig-zag pattern).

It is admitted that the readout system of the applicants invention (i.e. Figure 5 of the present application) is different from the system disclosed in Mimura in view of Ochi, however as currently written claim 1 allows the alternate interpretation discussed above. If claim 1 were amended to read "characterized in that each row includes both said first and second light detecting elements alternately disposed and activated by first read lines to generate odd field signals, and in that said first and second light detecting elements in two adjacent rows disposed in a serrated manner are activated by second read lines to generate even field signals", and a similar amendment to claim 7 were made, the alternate interpretation would no longer be possible and claims 1 and 7 would be allowable over Mimura in view of Ochi.

The applicant further argues that the sensor of Mimura is probably limited to a CCD implementation and not CMOS as in the subject of the present application. This is speculation and is irrelevant to the discussions of the claims since claim 1 (and its dependents) do not specifically require a CMOS image sensor. Applicant further argues that the offset of the resulting design of Mimura in view of Ochi results in a field offset of one pixel, instead of the one-half pixel offset of the present application. This is also irrelevant to the claim discussions as it is never claimed.

In regard to claims 2 and 6 the applicant argues that Ackland teaches the physical construction of a specific type of pixel using four transistors and that Ackland does not disclose how the specific type would be incorporated in the present invention. However Ackland teaches general advantages of using reset transistors (i.e. resetting the pixel) and source followers (i.e. buffering the pixel from output nodes) in imaging devices that could be used as teachings for incorporating similar structures in any imaging device, not just the specific type of device disclosed in Ackland.

In regard to claim 5, the applicant has not pointed out any claim language that would make claim 5 allowable over Ackland in view of Ochi, and as such the rejection of claim 5 stands.

As the applicants arguments have been fully considered and are found to be non-persuasive, the rejections over Mimura in view of Ochi, Mimura in view of Ochi in further view of Ackland and Ackland in view of Ochi stand.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mimura (US 6,249,643) in view of Ochi (US 4,542,409).

[claim 1]

In regard to claim 1, note that Mimura discloses an image sensor for sensing light of an image, said image sensor comprising a plurality of first (Figure 1, Item "n LINE") and second (Figure 1, Item "n+1 LINE") elements arranged in rows and columns for generating respective analog signals in proportion to the intensity of the light impinging respectively on each of the light detecting elements (Column 2, Line 64 – Column 3, Line 3), characterized in that the first and second light detecting elements in each row of the sensor are alternately disposed (Figure 2(b), the examiner notes that each row of first and each row of second elements are alternately disposed in a vertical direction) and in that the first and second light detecting elements in two adjacent rows are disposed in a serrated manner (Figure 2(b), the examiner notes that in two adjacent rows, n and n+1, the first and second elements are offset to form a serrated pattern). Therefore, it can be seen that Mimura lacks first read lines to generate odd field signals

and second read lines to generate even field signals, by selectively activating the first and second light detecting elements of the sensor.

It is further noted that Mimura generates an interlaced readout by performing a "zigzag" readout of the array (Figure 5(a)), and changing the position of a switch (Figure 4, Item 78) to alter the output position of the current cell being read. Ochi suggests a simpler method for interlaced readout in which first and second read lines are used to read out even and odd field signals respectively (Figure 5, Items V_A and V_B), witch results in simplified interlaced readout (Column 6, Lines 10-25). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the readout line pattern of Ochi with the image sensor of Mimura to obtain an image sensor with is capable of simplified interlaced readout.

[claim 4]

In regard to claim 4, note that the first light detecting elements comprising two access transistors (Ochi, Figure 5, Items 73-1 and 73-2) coupled in parallel are activated by first (Ochi, Figure 5, Item 52) and second read (Ochi, Figure 5, Item 51) lines respectively, connected at the respective gates thereof, and wherein each of the second light detecting elements comprise two access transistors coupled in parallel and activated by the first read line (Ochi, Figure 5, Item 52) and another second read line (Ochi, Figure 5, Item 53), respectively, connected at the respective gates thereof.

[claim 7]

Claim 7 is a method claim corresponding to apparatus claim 1. Therefore, claim 7 is analyzed and rejected as previously discussed with respect to claim 1.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mimura (US 6,249,643) in view of Ochi (US 4,542,40) as applied to claim 1 above, and further in view of Ackland et al. (US 5,576,763).

[claim 2]

In regard to claim 2, the interlaced readout image sensor of Mimura in view of Ochi comprises photocells which include a photodiode and two access transistors coupled in parallel (Ochi, Figure 5). Therefore, it can be seen that Mimura in view of Ochi lacks light detecting elements comprising a reset transistor and a source follower connected to the two parallel access transistors.

Ackland discloses an active pixel cell for use in an image sensor, which includes a reset transistor (Figure 3, Item 120; Column 4, Lines 19-22) to allow resetting of the cell and a source follower (Figure 3, Item 125; Column 4, Lines 31-34) to buffer the output of the cell. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to adapt the photo cell of Mimura in view of Ochi with the reset transistor and source follower of Ackland to include the benefits of resetting and buffering as taught by Ackland.

8. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ackland et al. (US 5,576,763) in view of Ochi (US 4,452,409).

[claim 5]

In regard to claim 5, note that Ackland et al. discloses a light detecting element for use in a CMOS active pixel image sensor (Figure 1) comprising a translating means

comprising a reset transistor (Figure 1, Item 120) for resetting the initial state of a photodiode in the light detecting element (Column 4, Lines 19-22), a source follower (Figure 1, Item 125) for buffering an analog signal (Column 4, Lines 31-34) and a select or "access" transistor (Figure 1, Item 130; Column 4, Lines 36 and 37). Therefore, it can be seen that Ackland et al. lacks two access transistors coupled in parallel to each other and connected to the output of the source follower transistor.

Ochi teaches a solid state imager, which uses FET access transistors coupled in parallel to each other (Figure 5, Items 73-1 and 73-2; Column 5, Lines 35-52) in order for the pixel cell to be read-out by two separate read lines. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to adapt the single access transistor Ackland et al. with the two parallel access transistors of Ochi to allow the pixel cells of Ackland et al. to be able to be read-out by two separate read lines.

[claim 6]

In regard to claim 6, note that the parallel access transistors of Ochi (Figure 5, Items 73-1 and 73-2) are coupled in parallel and are activated by a first read line (Figure 5, Item 51) connected to the gate of the first access transistor and a second read line (Figure 4, Item 52) connected to the gate of the second access transistor as claimed.

Allowable Subject Matter

9. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base

claim and any intervening claims.

[claim 3]

In regard to claim 3, the prior art does not teach of fairly suggest a readout of light detecting elements in which the elements in two adjacent rows activated by second read lines substantially have average vertical location between the two adjacent rows and wherein the components of the first and second field signals are correlated with one another.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J Henn whose telephone number is (703) 305-8327. The examiner can normally be reached on M-F 7:30 AM - 5:00 PM, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R Garber can be reached on (703) 305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TJH
6/30/2004

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